13 TOOLMARK EXAMINATIONS AND COMPARISONS

13.1 Assignments

13.1.1 Review the notes in reference to the section entitled "*Manufacture of Modern Firearms*." Those machining methods are the basis for toolmark identification as they were for firearm identification. However, it should be noted that in the broad definition of toolmarks identification, certain other related types of examinations are also performed. Discuss your review with the Training Officer.

(*Use Training Assignment #64 to complete this objective.*)

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Training Officer Date

13.1.2 Define the word *"tool*" and "*toolmarks identification*" in the narrow sense of the expression. Also define toolmark identification in its broadest sense, and determine the kinds of conclusions that may be reached in toolmark identification. Set these out in detail and discuss these with the Training Officer.

(*Use Training Assignment #64 to complete this objective.*)

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Training Officer Date

13.1.2 Discuss the significance of examining submitted tools first for trace evidence and itemize several types of such deposits.

(*Use Training Assignment #64 to complete this objective.*)

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Training Officer Date

13.1.4 In a case involving a toolmark examination wherein no tool is submitted, determine the types of conclusions which can be reached. Consider such things as the type of tool, size of the tool, action employed by tool, value of toolmark for comparison purposes, and unusual tool features. Discuss the "*no tool*" case with your Training Officer.

(*Use Training Assignment #64 to complete this objective.*)

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Training Officer Date

13.1.5 Define the following terms as they relate to toolmark identification and give three examples of tools or methods that could produce each category:

a. Shearing
b. Pinching
c. Fracture
d. Scrape mark
e. Impression
f. Slicing

(*Use Training Assignment #65 to complete this objective*.)

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Training Officer Date

13.1.6 Define the term "*class characteristics*" as it applies to toolmark identification. Using the tools or methods selected as examples in the above, describe their respective class characteristics in detail.

Select at least two tools representative of each category listed in paragraph 5, above. Produce toolmarks with each tool and observe the class characteristics of the toolmark. Vary the angle and force with which each tool is used.

(*Use Training Assignment #65 to complete this objective*.)

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Training Officer Date

13.1.7 Using soft copper wire of approximately 1/4-inch diameter, make cuts through it with the tools that employ a shearing, pinching and slicing action. Make test cuts in lead using the same tools. Attempt to identify the cuts in the copper wire as having been made by the same tool as that which cut the test lead. Support your results with photographs and note any lighting considerations made necessary by the color difference between copper and lead.

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Training Officer Date

13.1.8 Select a flat-bladed tool such as a screwdriver, and a pry bar and make marks in a piece of copper or brass sheeting. Make the same type of marks in lead with both tools. Microscopically compare those in the brass or copper sheeting with the test marks in the lead. Attempt to identify the appropriate marks with the appropriate tool. Photograph your results and comment on the difference in the quality of marks made by each tool.

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Training Officer Date

13.1.9 Using a drive pin punch, produce an impression in a piece of brass sheeting. Produce a set of test marks in lead and examine these two marks. Attempt to identify these as having been made by the same tool. Support your results by photographs.

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Training Officer Date

13.1.10 Using a junked doorknob and a serrated-jawed tool, have the Training Officer produce impressions and scrape marks like those produced by an attempt at an entry. Devise a method of obtaining test marks in lead like those produced by the serrated-jawed tool on the doorknob. Microscopically examine the marks on the doorknob with those on the test material. Identify the tool with the marks on the doorknob and reproduce the tool-doorknob orientation and relate each mark to its respective serration on the tool.

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Training Officer Date

13.1.11 Learn the technique of reverse lighting. Obtain a piece of brittle material such as Plexiglas or pot metal and fracture it into two fragments. Attempt to identify the two fragments as having once been a single object. Take notes and support your results by photographs.

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Training Officer Date

13.1.12 Obtain an ax blade that contains numerous defects. Cut a piece of seasoned wood such as dowel rod with the ax blade and attempt to identify the blade with the cut. Insure that your test cuts are consistent with your "*unknown*" with respect to the orientation of the ax to the wood and the direction of the grain. Support your results with sketches and photographs.

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Training Officer Date

13.1.13 Obtain a section of large-diameter telephone cable and cut it with the ax used above and study the effects of a slicing action on a multi-stranded cable. Note the quality and extent of microscopic marks of each strand and comment on the problems involved in identifications of this sort. Photograph the sliced end of the cable.

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Training Officer Date

13.1.14 Discuss the fact that generally saws, files and abrasive tools are not identifiable with the marks they produce. Cite any exceptions to this rule.

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Training Officer Date

13.1.15 Obtain a used tire and make cuts and stabs into the sidewall with a fixed blade knife. Attempt to make comparisons of the toolmarks produced by the knife. Support your results with photographs and notes. Discuss how the results of your examinations might be altered if the knife had been sharpened after making the questioned cuts, or if the knife had been used for an extended period of time after making the initial questioned cuts.

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Training Officer Date

13.1.16 Investigate pressure/contact examinations in regard to objects that may have been in contact with each other for an extended time. Research several cases of this type and set these out in your notes.

(*Use Training Assignment #64 to complete this objective*.)

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Training Officer Date

13.1.17 Discuss and demonstrate the making of casts of toolmarks. Also, discuss the potential of such casts and of photographs alone in making toolmarks identifications.

(*Use Training Assignment #64 to complete this objective*.)

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Training Officer Date

13.2 Reference Materials Toolmark Examinations, Comparisons & Identifications

The following reference materials serve several purposes:

- To provide a wider range of additional resources in a given topic
- To provide reference materials for future use
- To gain additional in depth knowledge in a particular subject area

Other references encountered in this category should be made as additional notes at the end of this listing.

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